بسمـــ الله الرحمن الرحيمـــ

فريق عمل كل الطب

يُقدمـــ

سلسلة كتب د/أحمد موافي

In Capsule Series

تم الرفع بواسطة فريق عمل كل الطب

ALLTEB MEDICAL TEAM

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جزى الله خيرا كل من ساهم في هذا العمل

لا تنسونا من صالح دعائكمـــ،،

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Cardiology revision

Enumerate :

1. **Causes of diastolic heart failure :**

   Any condition that leads to stiffening of the left ventricle can lead to diastolic dysfunction

   a. **Hypertension** .
   b. Aortic stenosis.
   c. Hypertrophic cardiomyopathy.
   d. Old myocardial infarction (*scarred heart muscle*)
   e. Old age (*age alone causes stiffening of the ventricles*)
   f. DM (*stiffening occurs as a result of glycosylation of heart muscle*).
   g. Pericardial effusion , constrictive pericarditis.

2. **Causes of left sided heart failure.**
3. **Causes of right ventricular failure.**
4. **Causes of acute pulmonary edema (cardiogenic & non-cardiogenic)**
5. **Causes of acute heart failure (cardiogenic pulmonary edema)**
6. **Causes of dilated cardiomyopathy.** 5 I
7. **Risk factors of atherosclerosis (coronary heart diseases)** : 10

   - 3 Non modifiable (سنه ، جنسه ، عيلته)
   - Hypertension
   - 3 HYPER **GLU**cose (hyper**g**lycemia , Hyper**l**ipidemia , hyper**u**rcemia)
   - 3 S : Stress , Smoking , Sedentary life.

8. **Causes of pulmonary hypertension.**
9. **Causes of secondary hypertension.**
10. **Complications of systemic hypertension.**

11. **Duke's criteria for the diagnosis of infective endocarditis :***

Major criteria :

1) Positive blood culture for infective endocarditis :

Typical microorganism consistent with IE from 2 separate blood cultures, as noted below:

- viridans streptococci, Streptococcus bovis. or
- community-acquired Staphylococcus aureus or enterococci, in the absence of a primary focus.

2) Echocardiogram finding :

- ✓ Intracardiac mass on valve or supporting structure.
- ✓ Abscess.
- ✓ New valve regurgitation.

Minor criteria :

1) Fever > 38
2) Echocardiogram : finding may be consistent with IE but not the classic.
3) Immunological : Roth spots , Osler nodes , GN , Rheumatoid factor.
4) Microbiological evidence: positive blood culture but does not meet a major criterion.
5) Serological studies support an infection.
6) Vascular : major criteria emboli , mycotic aneurysm, conjunctival hemorrhage, Janeway lesions.

Clinical criteria for infective endocarditis requires:

- Two major criteria, or
- One major and three minor criteria, or
- Five minor criteria

12. **Causes of syncope.**

13. **Causes of postural hypotension** (orthostatic syncope):

4 A (**A**utonomic neuropathy , **A**dison's, **A**lph blockers, **A**ge : old) + weakness of the muscles of LL.

14. **Causes of atrial fibrillation.**
15. **Causes of sinus bradycardia.**
16. **Causes of Premature beats (extrasystole)**
17. **Types of shock and their causes.**
18. **Cardiac causes of chest pain.**
19. **Causes of acute dyspnea with acute chest pain** : MI & 6 p (P104)
20. **Risk factors of DVT (pulmonary embolism)** : **6 O** P102

    Operative , **O**ld age , **O**ncology , **O**ral contraceptive pills , **O**besity , **O**thers ☺ : 2C (Congestive heart failure , Coagulation disorders e.g. protein C & S deficiency)
21. **Causes of painless myocardial infarction.**
22. **Complications of myocardial infarction** (Early & Late)
23. **Presentations of ischemic heart diseases :**
    - ☠ Asymptomatic.
    - ☠ Angina (stable , unstable)
    - ☠ MI
    - ☠ May also presented by one of the early complications of MI (…….)
24. **Most common causes of cardiac tamponade :** 4 C

    Cancer , **C**RF , **C**ardiac injuries, **C**ryptogenic (idiopathic)
25. **Causes of dry pericarditis** : 7 I , 2R + Post cardiotomy syndrome.
26. **Causes of pericardial effusion.**
27. **Causes of heart failure with bradycardia :**

    Myxedema, B blockers, Digitalis, heart block, uremia.

28. Pathological causes of hyperdynamic circulation = causes of water hummer pulse = causes of capillary pulsation.

- Anemia.
- A-V fistula
- Cirrhosis
- Thyrotoxicosis.
- Gram-ve septicemia
- Beri-Beri

29. Causes of refractory heart failure.

30. Cardiogenic sources of systemic emboli :

- **M**itral stenosis.
- **M**yocardial infarction.
- **M**yocardial aneurysm.
- **M**itral valve prolapsed.
- **M**yxoma.
- **A**trial fibrillation.
- **A**rtificial valve.
- Infective endocarditis.

31. Endocrinal causes of hypertension.

32. Causes of isolated systolic hypertension :

- **Atherosclerosis.**
- **Thyrotoxicosis.** ♫ ♫
- Aortic regurge, PDA.
- Increased stroke volume.
- Complete heart block .

33. Non-atherosclerotic causes of myocardial infarction :

- Coronary artery diseases : spasm, dissection, PAN, Takayasu's disease.
- Coronary angiography.
- Aortic stenosis, regurge & prolonged hypotension.
- Polycythemia, Sickle cell anemia, DIC, TTP.
- Embolism : IE, Artificial valve, myxoma.

34. Poor prognostic factors in myocardial infarction :

I. **Early :**

- Persistent low BP
- Persistent tachycardia.
- Ventricular arrhythmia.
- Anterior MI with 2nd or 3rd degree heart block.
- Cardiac rupture.
- Cardiogenic shock.
- Old age.
- Previous MI.

II. **Late :**

-Recurrent angina. Myocardial aneurysm. - DM.

35. Cardiac indications of ß blockers 6

36. Uses of diuretics in cardiac patients.

37. Drugs commonly used during cardiopulmonary resuscitation (CPR)*

- Epinephrine : It is used in all situations of arrest.
- Dopamine : It is used mainly cases with cardiogenic shock.
- Atropine : It is used mainly in cases with significant bradycardia.
- Antiarrhythmic drugs : according to the situations.

38. Indications , contraindications of anticoagulants :

Indications :

- DVT & pulmonary embolism. (therapeutic & prophylaxis in high risk patients)
- Atrial fibrillation.
- Valvular diseases : MS , artificial valve.
- Myocardial infarction : to prevent mural thrombi and DVT.
- Unstable angina.
- Prevention of stroke after TIAs.

Contraindications :

- Bleeding tendency e.g. liver diseases.
- Hemorrhagic stroke.
- Peptic ulcer.
- Pre & post operative.

39. Causes of chronic hypotension :*

- Severe reduction of COP
- Addison's disease.
- Malnutrition & cachexia.
- Chronic bed rest.
- Neurological disorders :

  (interference with neural pathways between vasomotor centre & the efferent sympathetic nerve on the blood vessels.)

  DS , Peripheral neuropathy , Syringomyelia , anti-sympathomimetics, spinal cord section, Syphilitic tabes dorsalis.

40. Causes of cardiogenic shock :*

I. Myopathic :

MI, myocarditis, cardiomyopathy, Ca channel blockers.

II. Mechanical : valvular (stenosis , regurge) , Hypertrophic cardiomyopathy & VSD.

III. Arrhythmia : brady & tachycardia.

41. Causes of myocarditis :*

a) Idiopathic.

b) Infection :

- Viral : CMV, Coxsackie, influenza, HIV.
- Bacteria : Streptococcus (rheumatic carditis), diphtheria (toxin-mediated heart block)
- Parasitic : toxoplasma gondii.
- Others : Spirochaetal (leptospirosis) , Fungal , Rickettsial.

c) Drugs (hypersensitivity reaction) : methyldopa, penicillin, anti-TB

d) Radiation : may cause myocarditis but pericarditis more common.

e) Autoimmune : SLE.

42. Actions of digitalis.

43. Side effect of ß blockers, Ca channel blockers, diuretics.

44. **Contraindications of thrombolytic therapy.** *See ttt of MI*

45. Factors contribute to digitalis toxicity :

Old age , Renal failure (digoxin), Liver failure (digitoxin), Hyokalemia, Hypomagnesemia, Hypercalcemia , Hyper & hypo thyroidism, Drugs (quinine, verapamil, amiodarone).

46. **Causes of mitral stenosis.**

47. **Causes of hemoptysis in MS :**

    - Pulmonary congestion.
    - Pulmonary apoplexy : Rupture of bronchial varices.
    - Pulmonary embolism.

48. **Causes of pulsus paradoxus.**

49. **Causes of absent redial pulse.**

50. **Abnormal early diastolic sound heard at the apex of the heart :**

    - Loud P_2.
    - S_3 gallop.
    - Opening snap.
    - Pericardial knock.
    - Tumor plop (atrial myxoma)

51. **Peripheral arterial signs of chronic aortic regurge.**

52. **Complications of rheumatic heart diseases. 12**

53. **Causes of absent apex.**

54. **Causes of cyanosis (central , peripheral)**

55. **Causes of clubbing of fingers.**

56. **Causes of accentuated S1, S2.**

57. **Causes of diminished S1.**

58. **Causes of abnormal splitting of S2.**

59. **Causes of cough in cardiac patient :***

    - Pulmonary congestion.
    - Pulmonary infection.
    - Pulmonary infarction.
    - Enlarged left atrium.

60. Cardiac causes of hemoptysis.

61. Cardiac signs of LSHF.

62. Local signs of LVE 👌

63. Local signs of RVE 6

64. Causes of pallor in cardiac patient :

- Anemia.
- Low COP.
- Shock.
- Rheumatic fever.
- Infective endocarditis.
- Myocardial infarction.

65. Causes of jaundice in cardiac patient :

- Hepatitis (injection).
- Systemic congestion → liver congestion → cardiac cirrhosis.
- Pulmonary infarction.
- Anticoagulant therapy.
- Artificial valve.

66. Signs of hyperdynamic circulations :

- Pulse : tachycardia , water hummer pulse.
- Neck : Carotid pulsation
- Hand : warm , capillary pulsation.
- Heart : accentuated S1 , S2 , haemic murmure.

67. Causes of unequal redial pulse :

- Coarcitation of aorta.
- Dissecting aorta.
- Embolism in brachial artery e.g infective endocarditis.
- Pancoast tumor.
- Unilateral cervical rib.

68. **Causes of fever in cardiac patient** :

- Rheumatic fever.
- Infective endocarditis.
- Pericarditis.
- Myocarditis.
- Collagen diseases e.g. RA associated with AR ☺
- Myocardial infarction.
- Pulmonary infarction.
- Pulmonary infection.

69. Criteria of cardiac edema :

a) Dependent : ankle edema in ambulant , sacral in bed ridden patients

b) Bilateral : but one side may be affected more due to DVT or in patient sleep on one side.

c) Pitting.

d) Edema precedes ascites EXCEPT in ascites precox.

70. Causes of giant " A " wave.

71. Causes of systolic expansion of neck vein :

I. Giant "V" wave : TR , AF , ASD , Constrictive pericarditis.

II. Cannon "a" wave :

- Nodal rhythm.
- Paroxysmal nodal tachycardia.
- Occasional cannon : VT , CHB.

72. Causes of non pulsating congested neck vein :

- Mediastinal syndrome, chronic mediastinitis (fibrosis of SVC)
- Severe pericardial effusion.
- Severe constrictive pericarditis.
- Severe RSHF.

73. Causes of pulsating congested neck vein :

I. Restrictive heart diseases :

a) Early constrictive pericarditis.

b) Early pericardial effusion.

c) Restrictive cardiomyopathy.

d) RV infarction.

e) COPD.

f) Acute attack of bronchial asthma.

NB : Inspiratory filling (Kausmaul sign) in a, b, c, d.

Expiratory filling in e, f.

II. Increased atrial pressure : Early RVF (commonest cause), TR,TS.

III. Increased intrathoracic pressure : pneumothorax, emphysema.

IV. Increased intraabdominal pressure : ascites, pregnancy

V. General : hyperdynamic state , AGN (hypertension).

More questions : www.incapsuleseries.com

* Textbook of internal medicine, Cairo university school of medicine. 2nd edition 2010

GIVE A SHORT ACCOUNT ON :

1. Management of acute pulmonary edema.

سؤال مهم جدا ممكن ييجي بصورة مباشرة كما انه يكتب في اجابة الاسئلة الاتية :

- LSHF
- Early complications of MI
- DD of acute dyspnea
- Acute comp of systemic HTN.

Causes :

A) **Cardiogenic :** (⇧ pulmonary hydrostatic pressure)

- Acute LSHF : MI , acute MR & AR.
- On top of chronic LSHF : MS with ppt factors : AF

B) Non cardiogenic (ARDS) :

(⇧ capillary permeability)

Def : Diffuse alveolar damage (DAD) ch by ⇧ cap permeability , pulm edema & refractory hypoxia .

Etiology : 2 s , 2 b , 2 p

- Sepsis
- Aspiration of gastric contents.
- 2 P : Pneumonia , Pancreatitis.
- 2 B : Burn , Bl transfusion .
- Terminal renal & hepatic failure .

C/P of acute pulmonary edema :

- Acute severe dyspnea (at rest & orthopnea)
- Cough with frothy blood tinged sputum.
- Central cyanosis
- Sweating , irritability
- Bilateral basal crebitations & rhonchi
- **Feature of the cause e.g. : MI ويذكر**

DD of acute dyspnea & chest pain : see book p 104 (MI & 6 P) مهمة جدا

ممكن تيجي سؤال مباشر علاوة انها هتتكتب مع معظم اسئلة الكارديو

Investigations :

- Chest x ray :
- ECG : <u>MI وتذكر</u>
- Echo :
- Catheterization.
- Cardiac enzymes : <u>for MI</u>
- ABGs : ⇩ O2 , ⇩ PCO2 (⇧ in late cases)
- Inv for ARDS : no LSHF (PCWP < 18)

Treatment :

- Cardiogenic : (……) see acute heart failure p14
- Non cardiogenic : TTT of ARDS (Antibiotics, cortisone, mech ventilator)

2. **Etiology, C/P, Investigations, Treatment of LSHF**

   acute heart failure لا بد من ذكر ال

3. **Congestive heart failure : LSHF + RSHF**
4. **Diastolic heart failure :** *see cardiology book p15*
5. **Refractory (Intractable) heart failure .**
6. **Diagnosis, prophylaxis, treatment of rheumatic fever.**
7. **Auscultation of mitral stenosis.**
8. **Diagnostic criteria of Infective endocarditis.**

   = <u>Duke's criteria : see above</u>

9. Etiology, C/P, Investigations, Treatment of Infective endocarditis.

i. Etiology : 2 factors (Infection & underlying cardiac disease)……

Types:

✍ **Sub acute IE** : most common & requires combinations of the 2 factors (infection & cardiac lesion).

✍ **Acute IE** : affecting the healthy endocardium ,usually occurs in the right side of the heart in addicts → Lung abscess esp with staph aureus.

ii. C/P : تخيل ان واحدة حلوة اوي داخله عليك دلوقتي

تبصلها	Toxic face
تحط ايدك علي دماغها	Fever
تبص في عينيها و بتمعن	👌
تمسك ايدها	🤚
تكشف عليها	Spleen, kidney, Brain , Lung
وبعدين قلبها	👌

iii. Investigations : اهم كلمتين هما

Blood culture & TEE (**T**rans **E**sophageal **E**cho)

iv. Treatment : (Prophylactic , therapeutic)

10. Complications of acute myocardial infarction :

✍ Early (acute) : 6 ✍ Late (Chronic) : 6

Acute : see book p 57

هتكتب ال ٦ حاجات و لازم تكتب في كل واحدة الاتي :

C/P , Inv , ttt e.g.

a- Shock :

Cardiogenic : هام جدا

- c/p : acute pulm edema
- Inv : ↑ JVP
- ttt : Dobutamine + intra aortic ballon counterpulsation .

Neurogenic :

- C/P : hypotension , bradycardia
- Inv : low JVP
- ttt : morphine

b- Acute HF = Acute pulmonary edema

c- Arrhythmia : V Tach وتذكر ال

11. Investigations , Treatment of myocardial infarction.

12. Unstable angina :

Definition : Angina at rest, lasting more than 10 min, ↑ frequency & severity.

Etiology :

a) Non occlusive coronary thrombosis on top of atherosclerosis.

b) Post infarction angina.

c) Coronary artery spasm : Prinzmetal (Variant) angina .

- Unpredictable angina, at rest.
- ECG : Transient ST elevation.
- TTT : Nitrate & Ca channel blockers are drugs of choice.

  ß blockers are contraindicated (↑ coronary spasm)

Investigations of unstable angina :

- ECG : show changes in about 30 - 50%
- Cardiac enzymes : are NOT elevated ,to differentiate it from MI.
- Coronary angiography.

Treatment : to reduce progression to MI

I. Medical :

- IV infusion nitroglycerin : 5-10 µg/min and is raised gradually.
- ß blockers.
- Anti -platelets : Aspirin , Clopidogrel *(Plavix)*
- LMW heparin : enoxaparine (clexane)

II. Coronary revascularization : PTCA or CABG.

13. Acute coronary syndrome :

A. Unstable angina.

B. MI (STEMI , NSTEMI)

14. The anatomy of coronary arteries.

15. Diagnosis & Treatment of angina.

16. Early management of myocardial infarction

- C/P
- Early complications only : 6
- Investigations : ….
- DD : of acute chest pain
- TTT : pre hospital (✋) & hospital (✋) only.

17. Complications (Target organ damage) of systemic hypertension.

✋ : 2C , 2R , Vascular

18. Lines of treatment of systemic hypertension, pharmacological details of 3 antihypertensive drugs.

19. <u>Hypertensive crisis :</u>

It is characterized by extremely high blood pressure

<u>Hypertensive urgency</u>:

Rapid rise of BP > 220/120 mmHg & **<u>NOT</u>** associated with target organ damage e.g. renal failure , heart failure .

<u>Hypertensive emergency</u>:

Rapid rise of BP > 220/120 mmHg & associated with target organ damage .

<u>Malignant HTN</u> : Hypertensive crisis with grade IV retinopathy plus papilloedema .

<u>Accelerated HTN</u> : Hypertensive crisis with grade III retinopathy.

Approach to the patient :

I. **History :**

a) History of hypertension or other significant diseases.

b) Medication use.

c) Symptoms of TOD (target organ damage) : ✋ 2C, 2R, vascular

- Cardiac : chest pain, shortness of breath.
- Renal : hematuria , decreased urine volume.
- CNS : nausea, vomiting, visual changes, seizures.

II. Examination :

a) Blood pressure reading in both arms.

b) Ophthalmoscope examination.

c) Neurological examinations : e.g. signs of lateralization.

d) Cardiac examination : e.g. Auscultation heart.

e) Abdominal examination : e.g. for bruits .

III. **Investigations :**

a) Lab : Electrolytes, Urea , creatinine, CBC ….

b) Echocardiography.

Treatment :

- It is unwise to lower the BP too quickly as it may lead to organ hypoperfusion & stroke .
- The initial goal of therapy should be to achieve BP diastolic 100-110 mmHg
- In hypertensive emergencies (with TOD), BP control should be within 1 hour to decrease the risk of permanent damage.
- In hypertensive urgency, BP control is more slowly over days not hours.

- **Drug therapy :**

i. Rapid acting antihypertensive drugs :

- Na nitroprusside (Nipride) : 0.5 – 5 µg/kg/min (infusion) .
- Nitroglycerine : 10 - 100 µg/kg/min.
- Diazoxide : 100 – 300 mg rapidly IV .
- Hydralazine : 20 mg IV .
- Labetalol : 20 mg IV every 10 minutes until control of BP (maximum 200 mg)
- Fenoldopam : is a new dopamine receptor agonist .
- Enalapril : IV 1.25 - 5 mg (over 5 min)/6h
- Captopril : 25 mg , repeat /30min if necessary.
- Lasix may be used with one of the above agents .

NB : *Never use sublingual nifedipine to reduce BP (it can cause an uncontrollable drop in BP and stroke).*

ii. Specific treatment :

a) Hypertensive encephalopathy : add

- Anticonvulsant : Diazepam IV .
- Cerebral dehydrating measures : 25 % Mannitol infusion with lasix .

b) Treatment of the target organ damage (TOD) : stroke , HF & RF .

20. Hypertensive encephalopathy.

Don't forget how to differentiate between stroke & hypertensive encephalopathy

- Stroke : signs of lateralization. (unilateral)
- Hypertensive encephalopathy : No signs of lateralization. (bilateral)

21. **C/P, Investigations of pulmonary embolism.**

    Don't forget DD of acute dyspnea with acute chest pain (MI & 6 b)

22. **Prophylaxis & treatment of pulmonary embolism.**

23. **There are no clinical or laboratory finding that will confirm or exclude the diagnosis of pulmonary embolism …… <u>Comment</u>**

24. **C/P, Investigations, Treatment of atrial fibrillation.**

25. **C/P, Investigations, Treatment of Ventricular tachycardia.**

26. **C/P, Investigations, Treatment of complete heart block.**

27. **C/P, Investigations of dilated cardiomyopathy.**

    - C/P : C A T (CHF, Arrhythmia, Thrombosis)
    - Investigations : scheme + biopsy.

28. **Management of pericardial effusion.**

29. **Diagnosis of cardiac tamponade.**

30. **What are the clinical features favoring restrictive cardiomyopathy rather than constrictive pericarditis.**

    - ✓ Prominent apical pulse.
    - ✓ Normal y wave, large V wave.
    - ✓ Associated signs of mitral or tricuspid regurge : due to involvement of the papillary muscles by fibrosis.
    - ✓ No pericardial knock.
    - ✓ X ray : no or mild RVE with no pericardial calcification.
    - ✓ The diagnosis is proved by abnormal endomyocardial biopsy.

31. **Cigarette smoking as a cardiac risk factor.** esp for ORAL EXAM

- It increases platelets adhesion, aggregation & whole blood viscosity.
- It increases carboxyhemoglobin & hematocrite value.
- It increases HR, catecholamine release & sensitivity.
- Decreases threshold of ventricular fibrillation.
- Decreases level of HDL
- It increases morbidity from peripheral vascular diseases.
- It increases mortality due to aortic aneurysm.
- Increases incidence of sudden death, coronary artery disease & malignant hypertension. (smoking accounts for 30% of all Cardiovascular deaths)

32. **When do you suspect an atrial myxoma ?** esp ORAL EXAM

- All features of mitral stenosis with intermittent varying murmurs without opening snap.
- Clinical features & Echo mimic infective endocarditis but with -ve blood cultures & splenomegaly is absent.
- Positional syncope.
- Pulmonary edema without obvious cause.

33. **DD of acute chest pain.**

34. **DD of RSHF.**

35. **DD of LSHF.**

36. **DD of acute dyspnea with acute chest pain.**

37. **DD of regular tachycardia.**

38. **DD of LCOP with systemic congestion.**

39. **DD of systolic murmurs (over the apex & over the base of the heart)** P33
40. **Differences between cardiac & bronchial asthma.**
41. **Differences between rheumatic & rheumatoid arthritis.** *See rheumatology*
42. **Differences between rheumatic fever & infective endocarditis.**
43. **Differences between: Stroke & hypertensive encephalopathy.**
44. **Differences between : AF & premature beats.**
45. **Cardiac, renal & hepatic edema.**
46. **Is HF always associated with a decreased EF ?** **ORAL EXAM**

Systolic dysfunction is defined as a decrease in contractile function most commonly measured as a decrease in EF. Many patients with HF have a decreased EF. However, almost half of all patients with HF have a normal EF. In some of these patients, diastolic dysfunction is the cause. Diastolic dysfunction results when the heart is stiff and ventricular filling is impaired, resulting in increased end-diastolic pressures. Patients may have diastolic dysfunction with or without systolic dysfunction. Typical signs and symptoms of HF occur with either normal or abnormal EF. Typically, the prevalence of HF with a normal EF is most common in elderly women.

Cases

1- A 65-year-old man with a history of hypertension & diabetes mellitus is seen in the ER complaining of sudden onset of chest pain and severe dyspnea at rest. He is currently taking enalapril (5 mg twice a day) to control his blood pressure. Physical examination reveals a pale white male in acute respiratory distress, who is anxious and diaphoretic. His blood pressure is 180/100 mm Hg, his apical pulse is 170 /minute and irregular, and his respiratory rate is 40 per minute. Examination of the lungs reveals rales extending two thirds up from the base of the lung fields bilaterally. Examination of the heart reveals a jugular venous pressure of 12 cm of water, a third sound (S_3), and a grade 2/6 pansystolic murmur heard at the apex. Arterial blood gas determinations show a partial pressure of oxygen of 50 mm Hg, a partial pressure of carbon dioxide of 30 mm Hg, and a pH of 7.48. A chest radiograph shows an enlarged heart and pulmonary edema. The ECG reveals atrial fibrillation with a ventricular response of 170 beats per minute, a loss of R waves, and 4 mm of ST elevation.

a) What is the provisional diagnosis ?

b) What is causing the pulmonary edema in this patient?

c) What medical therapy should be used to treat this patient acutely ?

a) What is the provisional diagnosis ?

A diagnosis of acute anterior wall MI complicated by atrial fibrillation and pulmonary edema .

b) What is causing pulmonary edema in this patient ?

1) **MI** impairs both the systolic and diastolic function of the left ventricle.lead to elevated filling pressures of the left ventricle and the left atrium ⇨ Pulmonary congestion ⇨ resulting in the transudation of fluid into the interstitium and then into the alveolar space.
2) **Atrial fibrillation with a rapid ventricular response**
   i. the loss of atrial systolic contraction → elevates the left atrial pressure → Pulmonary congestion.
   ii. the rapid ventricular rate results in significant shortening of diastolic filling time further impairing filling of the left ventricle.
   iii. the rapid ventricular rate increases myocardial oxygen demands, which may increase ischemia, which in turn worsens the pulmonary edema.
3) **Hypertension,** especially when chronic and poorly controlled, produces a stiff, hypertrophied myocardium causing elevated ventricular filling pressures.
4) **Mitral regurge** (Pansystolic murmure): due to papillary muscles dysfunction or rupture.
5) **Anxiety** secondary to the pain and breathlessness is likely to increase the heart rate and blood pressure, thereby contributing to pulmonary edema by increasing the afterload.

c) What medical therapy should be used to treat this patient acutely ?

1- TTT of MI : acute coronary reperfusion (revascularization) : PTCA

2- TTT of acute pulmonary edema (.....)

2- A 45-year-old man is seen in the outpatient department complaining of intermittent throbbing headaches that have occurred every morning for 2 weeks. He has a history of untreated, asymptomatic, sustained high blood pressure (160 to 170/100 mm Hg) of 4 years' duration. He has no history of palpitations, sweating, tremor, or periodic paralysis. His father was also hypertensive and died of stroke at 67 years. The patient has smoked cigarettes, two packs per day, for 30 years. He is taking no medications. His physical examination reveals a blood pressure of 170/110 mm Hg and a heart rate of 90 per minute and regular. Fundus examination reveals the presence of arterial vasoconstriction. Cardiac examination reveals a sustained apex, S_4, no S_3, and no murmur. During abdominal examination, no bruit or mass is found and the neurologic and other systems are unremarkable.

a) How should blood pressure be measured?
b) What is the most likely cause of this patient's hypertension?
c) What laboratory tests are indicated?
d) Will lifestyle changes improve his blood pressure?
e) What is the target blood pressure with treatment?

a) How should blood pressure be measured? ☺

The patient should be seated in a chair with his feet on the floor in a quiet place for at least 5 minutes. At least two measurements should be made. Systolic blood pressure is defined as the blood pressure at which the first sound is heard and diastolic pressure is defined as the pressure at the disappearance of the sounds.

b) What is the most likely cause of this patient's hypertension?

The most likely cause of this patient's hypertension is essential hypertension.

c) What laboratory tests are indicated?

- Blood urea , serum creatinine.
- Electrolytes : K , Ca.
- Blood glucose, Lipid profile (cholesterol and triglyceride)
- Urine : for blood , protein and glucose.

d) Will lifestyle changes improve his blood pressure?

i. Stop smoking.
ii. Weight reduction (BMI should be < 25 Kg/m^2)
iii. No alcohol.
iv. Regular exercise.
v. Diet : Low salt : < 6gm/d, Potassium : increase fruits & vegetables, low saturated fat diet.
vi. Avoid stressful conditions as possible (meditation)

e) What is the target blood pressure with treatment?

The target blood pressure with treatment is less than 140/90 mm Hg. If the patient had diabetes or chronic kidney disease the recommended target blood pressure would be less than 130/80 mm Hg.

You instruct your patient in lifestyle changes and start him on lisinopril 10 mg once daily. In 2 weeks you increase the lisinopril to 20 mg daily because the blood pressure is still 160/98 mm Hg. Electrolytes and creatinine levels are unchanged. The increased lisinopril does not significantly alter the pressure and you add chlorthalidone at 25 mg daily. In 4 weeks his blood pressure is 139/88 mm Hg and his electrolytes and creatinine levels are normal. The blood pressure remains well controlled for the next 6 months, but the patient does not return for the next follow-up visit. Two years later, he presents to the ER complaining of blurred vision and severe headaches. His physical examination at that time reveals a blood pressure of 240/140 mm Hg and heart rate of 100 per minute. He is mildly confused and the fundus examination reveals retinal hemorrhages, exudates, and papilledema. Heart examination shows clear lungs and a sustained left ventricular apical impulse and S4. The chest radiograph shows mild to moderate cardiomegaly. His serum creatinine level is 2.4 mg/dL. The ECG shows normal sinus rhythm and ST-segment depression and T-wave inversion. Troponin is normal and he has no chest pain.

a) What is the diagnosis?
b) What is the most likely reason for the fundus findings and the serum creatinine level of 2.4 mg/dL?
c) What should be the plan of treatment now?

a) What is the diagnosis ?

The diagnosis is hypertensive crisis (malignant hypertension)

b) What is the most likely reason for the fundus findings and the serum creatinine level of 2.4 mg/dL?

Marked increase in blood pressure causing a damage to the vascular endothelium causing fibrinoid necrosis in the vessels of the eye and in the kidney. These changes are exacerbated by activation of the rennin-angiotensin system.

c) What should be the plan of treatment now?

See above (The approach to a patient with hypertensive crisis.

3- A 42 years old woman is admitted for weakness and fever. She has been taking tetracycline for 2 weeks at home for symptoms of flu with no improvement. The patient is pale & feverish with petechiae in the conjunctiva. Examination of the heart reveals a harsh loud pansystolic murmur. The spleen is palpable 4 cm below the left costal margin.

a) What is the most likely diagnosis ?

b) What are the other clinical finding you may find ?

c) How to manage the case ?

Likely diagnosis : **Infective endocarditis**.

4- A 31 year old man complaining of a sudden onset of sharp left chest pain, increased by deep inspiration & coughing. Physical finding, chest X ray and ECG are normal. What is your differential diagnosis ?

- Acute pleurisy (coxsackievirus A,B)
- Acute pericarditis (coxsackievirus B)
- Pneumonia (viral)
- Pulmonary embolism or infarction.
- Pneumothorax .

5- A 55 year old man presents to the emergency center with acute onset of squeezing and diffuse anterior chest pain associated with diaphoresis and dyspnea.

a) What is your differential diagnosis ?
b) Which tests will help confirm your clinical suspicions ?
c) Is a normal troponin helpful in excluding an acute MI ?

a) **DD :**

- Acute MI.
- Angina.
- Aortic dissection.
- Acute pericarditis.
- Acute pulmonary embolism.
- Acute pneumothorax.

b) **Which tests will help confirm your clinical suspicions ?**

- Serial ECG : to look for ST elevation (MI, dry pericarditis), ST depression (angina , NSTEMI).
- Serial cardiac enzymes : will help to confirm the diagnosis of MI

- Chest X ray : to look for evidence of pneumothorax, wedge shaped pulmonary opacity suugests pulmonary embolism.
- NB : The absence of any ECG changes of MI or ischemia in patient with severe anterior chest pain radiating to the back should suggest the clinical diagnosis of aortic dissection (confirmed by CT, MRI, TEE).

c) Is a normal troponin helpful in excluding an acute MI ?

A normal troponin 8 or more hours after the onset of chest pain generally excludes acute MI but does not exclude Acute coronary syndrome.

6- a 68 year old asthmatic man has stable exertional angina of 4 years duration. His past medical history reveals intermittent claudication after walking 50 yards.

- What is your approach to medical therapy of his angina ?

This man has 3 medical problems : asthma, angina, intermittent claudication.

Of the available antianginal drugs :

- ß blockers are contraindicated because of the presence of asthma. Cardioselective ß blockers (metoprolol, atenolol) may be used in low doses in asthma.
- The presence of peripheral vascular disease, as manifested by intermittent claudication, also is contraindication for the use of any ß blocker.
- So, Ca channel blockers or nitrate are the anti-anginal drugs of choice in this patient.

7- A 50 year old man, heavy smoker, presented to ER with severe retrosternal chest pain of one hour duration. On examination he was sweaty , his pulse was 94/m, his BP was 100/70. A third sound was heard over the apex . Troponin levels was high.

a) What is the most proper diagnosis ?

b) How would you manage this case ? (investigations and treatment)

Six hours later runs of ventricular tachycardia started to show on the monitor.

c) What are you going to do ?

In the next few days he was stable, and was discharged from the hospital.

d) In your opinion, what are the medications he should receive ?

Ten days later he developed recurrent episodes of angina.

e) What would be the appropriate management ?

a) Most likely diagnosis is **myocardial infarction** with LVF because :

- Data with : severe retrosternal chest pain of one hour duration, heavy smoker old patient, sweating , high troponin. LVF suggested by S_3.
- No data against.

b) Investigations of MI , TTT : pre hospital & hospital ttt

c) Anti-arrhythmic drugs e.g. Lidocaine or amiodarone , cardioversion.

d) After discharge ttt of MI : ✋

e) PTCA or CABG is considered (mention indications) , ttt of unstable angina.

8- A 45 year old diabetic, heavy smoker, presents with recurrent precordial pain, often radiating to the chin & left shoulder. The pain is precipitated by moderate physical activity or emotional stress, and is relieved by rest and sublingual nitrate.

a) What is your investigations ?

b) How to investigate the case ?

c) How to treat the case ?

Two years later, he was brought to the ER in severe and persistent acute chest pain, with the same distribution as before, but without relief by rest, sedatives or nitrates. ECG showed depressed ST segment and inverted T wave in leads I, II, aVL and v4-6. CK MB was normal.

d) What is your diagnosis ?

Three years later, the patient was brought again in shock, with BP 80/30 mmHg, regular pulse with a rate of 40/m, venous pulsation in the neck at a rate of 100/m, with occasional cannon waves. The patient denies having had significant chest pain at the onset or before the episode. ECG shows deep wide Q , raised convex ST and inverted T in leads II, III and aVF together with P-QRS dissociation in all leads.

e) What is the probable diagnosis ?

f) How to investigate this patient ?

g) How to treat this patient ?

a) The most likely diagnosis is stable angina.

d) <u>unstable angina</u> because of normal CK MB & depressed ST segment.

Serial cardiac enzymes is recommended to exclude NSTEMI.

e) Painless inferior myocardial infarction complicated by **<u>complete heart block</u>**.

NB : painless MI may be due to diabetic neuropathy.

f) Investigations of MI (……)

g) TTT of MI but avoid morphine , ß blockers & nitrate because of shock.

TTT of complete heart block : atropine , temporary pacemaker.

Remember

Site of infarction as regard to ECG

- ✓ Anterior infarction : V_2 - V_5
- ✓ In**<u>f</u>**erior MI : III, aV**<u>F</u>**
- ✓ **<u>L</u>**ateral MI : I, aV**<u>L</u>**, V_5 - V_6.
- ✓ Anterolateral MI : I, aVL, V_2 - V_6
- ✓ Posterior MI : dominant R waves in lead V_1

9- A 67-year-old woman is admitted to the hospital complaining of severe symptoms of shortness of breath that has worsened over the last 12 hours. She tells you that she has had diabetes mellitus for the last 20 years and hypertension that has been fairly well controlled for 15 years. Your examination reveals an S3 gallop and rales to her midscapular area. She also tells you that she has experienced recurrent chest heaviness over the last 2 days. When the ECG is done, there are Q waves in leads V2, V3, V4, and V5. A call to her regular physician reveals she had a normal ECG when he saw her 1 month ago.

a) What is the provisional diagnosis ?
b) At this point, what should you do?
c) What therapeutic interventions should be instituted at the time of admission?
d) What are the indications of CABG ?

a) Recent anterior MI with left ventricular failure.

b) She needs to be hospitalized immediately, treated for HF, monitored for arrhythmias and recurrent ischemia.

Thrombolytic therapy or PCI is not indicated because this is a completed infarction, nearly 48 hours old.

c) TTT of cardiogenic pulmonary edema : oxygen administration and diuretics…

TTT of MI : ✋

monitoring is necessary to detect arrhythmias.

d) Indications of CABG :

- Left main coronary artery disease or 3 vessels disease.
- For diabetic patient with 2 or 3 vessels disease.

10- A 59 year old man presents with acute shortness of breath, epigastric pain and vomiting. Examination reveals a pulse of 58/m and BP 60/30mmHg. The JVP is significantly raised, lung and heart examination is within normal limit. ECG reveals ST elevation in leads III and aVF.

a) What is the most likely diagnosis, and why ?

b) I know that you not consider perforated peptic ulcer in the diagnosis of this case. Why ?

c) Mention the most likely cause of bradycardia in this case ?

a) The most likely diagnosis is <u>right ventricular (inferior) MI</u>.

Data with :

- ☞ Triad of : Distended neck veins, Hypotension, Clear lung.
- ☞ ECG finding.

b) Perforated peptic ulcer often presents with epigastric pain and vomiting and might lead to a septic shock. This manifests with hypotension, tachycardia and the JVP is not raised. Also one would not expect to see ischemic changes on ECG. So data against perforated peptic ulcer are :

- High JVP.
- Pulse : 60/m.
- ECG findings.

c) Bradycardia is often seen with inferior MI because the right coronary artery.